

ORTHOMORPHIC SURGERY FOR MANDIBULAR DEFORMITY - A CASE SCENARIO

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ABSTRACT

Facial asymmetry poses one of the most challenging dento-facial deformity to correct. When evident, it has an enormous socio-psychological impact on the affected individuals making surgical intervention as the choice of treatment. The Orthognathic surgery and/or Reconstructive procedures form the conventional approach for such deformities which uses the normal counterpart as the reference. However, instances where asymmetry is secondary to the deformity in the configuration and shape of the jaw bone without involving the dental occlusion, the orthomorphic surgery plays a vital role. We present a case of facial asymmetry corrected by performing orthomorphic surgery.

KEYWORDS: Facial Asymmetry, Orthomorphic Surgery, Orthognathic Surgery & TMJ Ankylosis

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INTRODUCTION

All human faces are accompanied with certain level of facial asymmetry. These physiological variations between the two sides of the face were first noticed by the ancient Greeks, as brought to light much later by survey of their statuary, which comprised of mild to moderate degree of facial asymmetries. Discrepancies which are minimal oft-times go unremarked by the individuals. Seemingly symmetrical faces that are esthetically gratifying do indeed manifest some skeletal asymmetries between the two facial sides and still be considered totally normal. The extent of asymmetry that becomes a concern for the patient relies on many factors, majority of which are psychological. ^[1]

Whenever evident, facial imbalance has vast socio-psychological effect on the affected individuals. Main etiological factors include developmental anomalies, infection, post-traumatic or post-surgical. The lack of treatment or insufficient intervention of unilateral temporomandibular joint (TMJ) ankylosis leads to the establishment of secondary changes in the mandible altering its structure, shape, and size along with the surrounding tissues. ^[2] Other causes of mandibular asymmetry include infection and trauma during the growth period, surgical procedure or a malunited fracture. ^[3]

The conventional methods of treatment in such dentofacial deformities include orthognathic surgery and/or reconstructive procedures. The two important factors which determines the choice of the treatment is the

extent of asymmetry and involvement of the surrounding structures. In case of orthognathic surgery and/or reconstructive procedures, the correction is done by considering the normal counterpart as working reference. [4] Although the restoration of functional occlusion forms the primary goal in cases with significant facial asymmetry, the additional concern relates to the improvement of beauty and cosmetics. This has oft-times been an origin of social despise for numerous of these patients. The concept of balance and beauty has often been thought of synonymously; and so, the freedom from doubt that unattractive and unappealing looks are the result of asymmetry. [5]

Although orthognathic surgery for the rectification of facial disfigurement secondary to deviation in structural and dimensional relationship is well established, it is unable to correct the contour deformities subjective to variable jaw shape. [6] Hence, orthomorphics fundamentals of treatment prove to be supplementary to orthognathic surgery or osseo-distraction. [7]

“Orthomorphics procedure” refers to the surgical procedure that involves an osteotomy directed at reinstituting the morphology of the bone thereby distinguishing it from the conventional orthognathic surgery (Figure 1a & 1b). Thus it aims at rectifying the malformations related to the configuration and shape of the jaws without modifying the occlusal status. [6] Indications for this procedure includes deformities which set in following cessation of skeletal growth, operated cases of TMJ ankylosis (both unilateral and bilateral) and hemi-mandibular hyperplasia. Whereas contraindications include systemic bone diseases, hemifacial microsomia and medically compromised individuals (psychological disorder, systemic diseases and alcohol or drug over-use).

CASE REPORT

A 22year old male showed up to our Maxillofacial Unit with a complaint of asymmetrical face pertinent to the left side. History revealed that he was surgically operated elsewhere for right TMJ ankylosis 6 years back. Clinical extra-oral examination revealed facial asymmetry of the left side more evident along the inferior border of the mandible [Figure 2,3,4]. Intra-oral examination revealed adequate amount of mouth opening with the presence of complete set of teeth without much of occlusal disharmony. Radiographic analysis was carried out using Orthopantomogram(OPG), Lateral Cephalogram, Postero-anterior Cephalogram and 3D Reconstruction that revealed hypoplastic mandible on right side with prominent right antegonial notch and deviation of jaw to the right side[Figure 5,6,7]. The planned treatment included orthodontic correction of minor dental discrepancies and surgical orthomorphics procedure for correction of esthetic deformity.

SURGICAL TECHNIQUE

The patient was induced under general anesthesia via nasotracheal intubation following which the procedure was carried out. The preparation of the oral cavity was done using diluted povidone-iodine. The incision site was infiltrated locally using 2% lignocaine. A vestibular incision was placed; full-thickness mucoperiosteal flap was reflected thereby exposing the lower border of the mandible while preserving the mental nerve bilaterally [Figure 8].

In this case, the osteotomy cut was placed on the non-ankylosed side (left side) of mandible. The bony cut was outlined as an unconventional genioplasty extended along the body to a cut of the lateral cortical surface of the ramus[Figure 9]. A full-thickness bony cut of the mandibular inferior border was carried out nearer to the area where the body is connected in an eccentric position. The osteotomy cut was expanded to include the lateral surface of the ramus following the external oblique ridge similar to the established Dal Pont modification of Obwegeser sagittal split osteotomy with the main difference being in the position of the medial cut which was placed on the lateral aspect of ramus. Care was taken to ensure the integrity

of inferior alveolar neurovascular bundle at the junction of the body and the ramus as the bony cut was changed from being full thickness to just an outer cortical osteotomy respectively. The anterior osteotomized fragment was repositioned to rectify the midline and reinstitute the vertical as well as antero-posterior relationship as planned [Figure 1a & 1b]. The final position was subjectively determined. Internal fixation was achieved using miniplates along with adjuvant autogenous cortico-cancellous bone graft which was harvested from iliac crest for interceding the overlapping edges [Figure 10]. Closure was carried out in 2 layers. A pressure dressing was applied extra-orally. Patient was maintained on liquid diet for 2 days and on soft diet for following 2 weeks. Patient was reviewed at intervals of 1 week, 1 month, 3 months and 6 months post-operatively that ensured facial symmetry and stable occlusion [Figure 11a & b].

DISCUSSIONS

Surgical correction of symmetrical deformities is less challenging when compared with asymmetrical ones. Considering the treatment options, orthomorphic procedures direct at correcting the contour defects leaving the occlusal status unaltered.

The etiological factors leading to facial asymmetry can be broadly categorized into developmental, infectious, post-traumatic and post-surgical. In our case, the facial deformity was the consequence of post-traumatic TMJ ankylosis. As per the fact, TMJ ankylosis causes destruction of the growth centre leading to deficient growth of mandible on the ipsilateral side secondary to lack of functional stimuli. The contralateral side gets pulled in the direction of ipsilateral affected side leading to asymmetrical face along with the features of pseudo-fullness of face on ipsilateral side and elongation on the contralateral side all of which causes a resultant deviation of the mandible to the influenced side. The conventional treatment in such cases of esthetic correction would involve the surgical procedures of ramal osteotomies and/or bone grafts. These procedures oft-times jeopardize the former occlusion. Another factor to be considered is the inadequacy of mouth opening and compromised dentition status which would preclude the use of orthodontic treatment in such cases.

Usually, in cases of unilateral mandibular deficiencies, the maxillary downgrowth is secondarily affected, thereby altering the position of the midfacial structures, leading to an occlusal cant. To verify this, we utilized a line drawn at an angle of 90 degrees to the inner inter-canthal line as the midline of face which revealed the facial asymmetry to be involving only the lower one-third of the face without presence of an occlusal cant. In such scenarios, the asymmetry of the mandible can be corrected by an inferior border osteotomy with or without any adjunctive procedures. Although, genioplasty being a common surgical procedure for repositioning of the chin in any of the 3 spatial dimensions, extended lateral sliding genioplasty is the author's preferred surgical method to be performed since 1992 for the rectification of asymmetry, chiefly in cases of residual malformations in unilateral TMJ ankylosis. Tessier, has put forth the merits of the technique involving 'long' bony cut reaching to the gonial region bilaterally.^[9]

The surgical technique of extended lateral sliding genioplasty involves placement of an intra-oral mandibular lower border osteotomy extending from the region of one gonion to the other in a position caudal to the inferior alveolar canal. As per study by Wolfe, estimated distance between the caudally positioned inferior alveolar canal to the mental foramen is 6mm. [10] In our case, the osteotomy cut was performed approximately 5 mm caudal to the mandibular canal on deficient side. However, the osteotomy was planned obliquely downwards by approximately 45° towards the lingual side so as to avoid the nerve canal. Numerous holes were created on the lingual cortex and the osteotomy was completed with an osteotome and a split spreader. The divided bone segment was glided laterally and forward, so as to augment the

chin and the recessed lateral aspect of the mandible thereby correcting the deformed mandible and the deviated chin. However, the lateral sliding of the divided segment often creates a step on the lateral mandibular contour which may necessitate the placement of a graft material to obliterate the step defect. The grafts used could be either autograft or allograft. The resected ankylotic bony mass can be applied as the graft substance when simultaneous aesthetic correction is planned thereby avoiding a secondary donor surgical site.

Lindquist et al. ^[11] reported 28.5% incidence of post-surgical (combined genioplasty and bilateral sagittal split osteotomy) altered sensation of lower lip and chin whereas an incidence of 10% of patients exhibited mental nerve paresthesia after genioplasty alone. Al-Bishri et al. ^[12] reported an incidence of 37% post-operative ipsilateral sensory disturbances after undergoing sagittal osteotomy. In this case, no altered neurosensory disturbances were observed due to the precise technique of maintaining an adequate cuff of tissue in the premolar region thereby preventing any injury to the mental neurovascular bundle.

Post-operatively initially due to pain and edema there was reduction in mouth opening which resolved after 5 days. Regular follow-up was carried out till a period of 6months post-operative. Final assessment revealed mild insufficiency in the mandibular body region, whereas esthetically pleasing outcomes at the symphysis and angle region. This could be explained on the basis of the ability to mobilize and reposition the osteotomized segment merely in the anterior and posterior region and does not rectify the straightened configuration of mandibular body. Similar outcomes were reported by Salins et al. [6] Postoperative healing of the graft donor and recipient site was satisfactory with no associated complications.

To summarize, the orthomorphic procedure offers various advantages over the orthognathic surgery for rectifying the facial imbalance. The merits include it's possibility of being done simultaneously with the surgical procedure for TMJ ankylosis correction, a relatively simple and faster procedure, pre-existing occlusion remains undisturbed, intra-oral approach, the chin can be aligned close to the midline, balance between the facial proportions (vertical and horizontal) improved and rapid psychological rehabilitation of the patient. However, the main limitation of this technique was its inability to institute a perfect symmetrical balance attributed to the relocation of malformed mandible segment rather than correction of the deformed configuration of mandible body. This would be evident as a flattened mandible contour that often needs subsequent augmentation.

Several modifications of this technique can be performed such as in cases requiring bridging of small osseous defects in the mandibular body region.^[6,13]

CONCLUSIONS

Any surgical intervention for rectification of an asymmetrical face is exceedingly challenging due to involvement of the hard and/or soft tissue; in any spatial and dimensional combinations. Howsoever, it is the efficacious management of the hard tissues that causes secondary changes in the soft tissue defects leading to favourable outcomes. Orthomorphic correction stands a useful procedure in treating mild to moderate cases of mandible malformation without any significant complications.

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Conflict of Interest

All the authors declare that there is no conflict of interest.

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Figure Legends

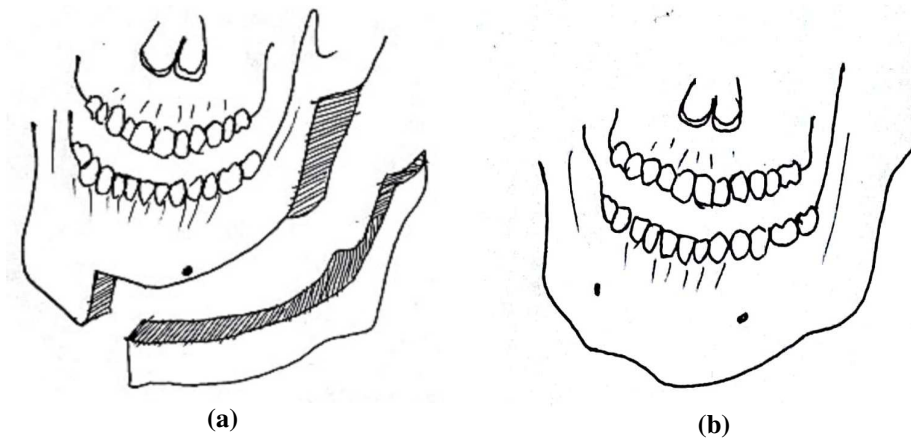


Figure 1(a& b): Schematic Representation of Orthomorphic Surgery



Figure 2: Pre Operative Profile Right



Figure 3: Pre Operative Profile Frontal



Figure 4: Pre Operative Profile Left

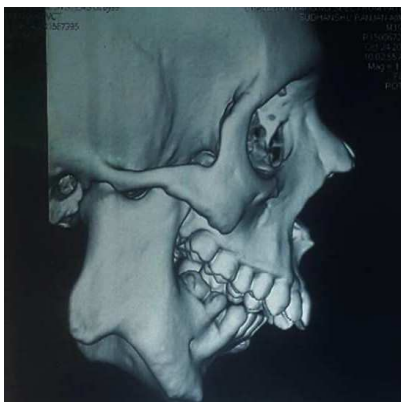


Figure 5: Pre Operative CT Scan 3D (Right)

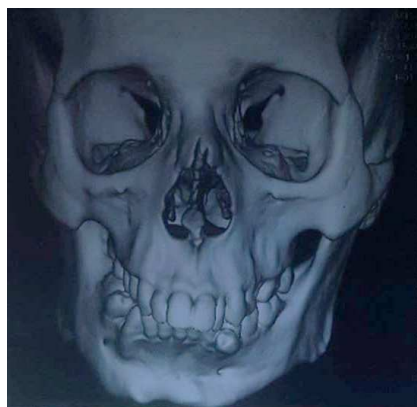


Figure 6: Pre Operative CT Scan 3D (Frontal)

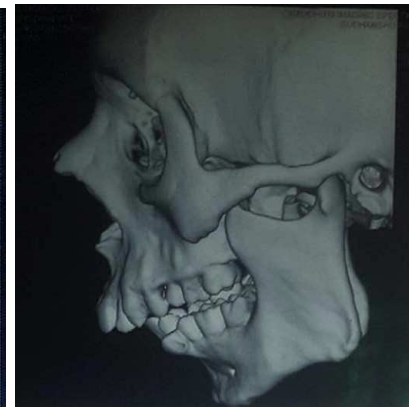


Figure 7: Pre Operative CT Scan 3D (Left)



Figure 8: Intra-Operative (Exposure)



Figure 9: Intra-Operative (Osteotomy)

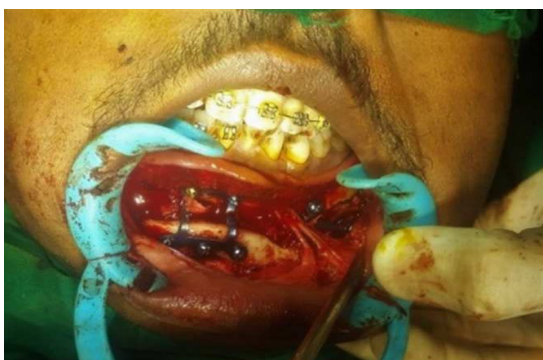
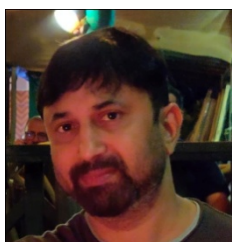


Figure 10: Intra-Operative (Fixation)



Figure 11 (a & b): Comparison of Pre-op and Post-op Profile Appearance

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